



Water Testing

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A private water supply is just that—private. The quality of the private water supply is the responsibility of the homeowner. State law in Pennsylvania does not require testing of private domestic water supplies and regulatory agencies do not regularly monitor the quality of private supplies. Therefore, the only way a homeowner can be certain that the water is safe to drink is to have the water tested periodically.

What Should the Water be Tested For?

To protect the health of family members, the water supply should be tested to see if it meets state and federal bacterial and chemical standards. It is possible to run a comprehensive water analysis, but this can be very expensive. The following tests address the most common and serious health concerns, and indicate contamination from sewage, manure, gas drilling, and mining activity.

Bacteria

While it is possible to test for almost every water-borne disease causing bacteria and virus, such tests would be very costly. Instead, a test for *total coliform bacteria* can be run. Most coliform bacteria do not cause disease, but they are present in the intestines of all warm blooded animals. Therefore, if these bacteria are present in a water supply, sewage or manure may be contaminating the water.

Other more specific bacteria tests, like fecal coliform bacteria or E. Coli may be used to better indicate the source.

Nitrates

Nitrate contamination of drinking water is important because of its effect on human and livestock health. Excessive concentrations of nitrate can cause methemoglobinemia (blue baby syndrome) in infants. To

protect infants, a water quality standard of 10 milligrams per liter nitrate nitrogen (mg/l NO₃-N) has been set for human consumption. Ten mg/l nitrate nitrogen is equivalent to 45 mg/l nitrate.

Sulfates & Total Dissolved Solids

Excessive concentrations of sulfates and other dissolved salts can cause gastro-intestinal problems in humans and animals. Water quality standards of 250 mg/l of sulfate and 500 mg/l total dissolved solids have been set for drinking water supplies.

pH

Water with a pH less than 6.5 or greater than 8.0 can cause corrosion problems in plumbing. Corrosion not only shortens the life of the pipe but also introduces dissolved metals like lead and copper into the water which can stain fixtures and pose a potential health hazard. Cattle and dairy cows are also sensitive to both low and high pH (below 5.5 and above 8.5) water. Water with a low pH may increase problems related to acidosis in dairy cows, and water with high pH may result in alkalosis problems.

Other Aesthetic Water Problems

In addition to obtaining a water supply that is safe to drink, it is also desirable to have water that is tasteless, odorless, and non-staining. To select the appropriate treatment equipment to eliminate these problems, the levels of a number of elements and compounds need to be determined.

Iron

High concentrations of iron gives water a metallic taste, stains clothing and fixtures, and promotes the growth of iron bacteria in the water system. Iron may occur naturally in groundwater or it may be introduced as a result of coal mining activities.

Hardness

Water hardness causes scaling problems in hot water pipes and water heaters, and interferes with the cleaning action of soaps and detergents.

Hydrogen Sulfide

Hydrogen sulfide gives water a “rotten egg” taste and odor. Because hydrogen sulfide is a gas, it comes out of solution very quickly. This makes it difficult to send a water sample to a laboratory for testing. Therefore, measurements for the concentration of hydrogen sulfide must be made on site.

Monitoring Impacts of Gas Drilling or Mining Activity

To demonstrate the impact of gas drilling or mining activity, it is useful to have your water supply tested for a number of minerals. Samples taken prior to gas drilling or mining should be collected by a disinterested third party. The testing should be done at an EPA certified laboratory. In addition to having a water supply tested for bacteria and nitrates, a number of other tests are helpful.

<u>Mining Activity</u>	<u>Gas Drilling Activity</u>
Total dissolved solids (TDS)	Total dissolved solids (TDS)
Iron (Fe)	Chlorides (Cl)
Sulfate (SO ₄)	Sodium (Na)
Acidity	Barium (Ba)
pH	Lead (Pb)
Langelier’s Saturation Index (LSI)	pH
Manganese (Mn)	Langelier’s Saturation Index (LSI)
Aluminum (Al)	Strontium (Sr)

How Often Should a Water Supply be Tested?

To assure that a well water supply is safe, it should be tested for coliform bacteria and nitrate at least once a year. Other chemical tests such as sulfates, total dissolved solids, nitrate, and pH should be made regularly, at least every three years.

Have the water supply checked if you have drilled a second well or changed the pump or plumbing. Also have the water supply tested if there is new mining or gas well drilling in the area, or any other activity that may pollute water or a change in the appearance, taste, or odor of the water.

The quality of surface water supplies fluctuates much more than that of well water supplies. All surface water are easily contaminated by bacteria. Surface water quality is affected by changes in temperature, algal blooms, amounts of rainfall and runoff, and the activity in the watershed. All drinking water from surface water supplies should be filtered and disinfected.

How Should a Water Sample be Taken?

Directions for collecting a water sample usually come with the sample containers obtained from the lab. These instructions should be followed carefully to ensure a representative sample. The aerator should be removed from the faucet and the water should be allowed to run for several minutes. Care must be taken not to touch the inside of the sample container. Samples should be refrigerated and delivered to the lab as quickly as possible.

Where Can a Water Test be Run?

There are many private laboratories in Pennsylvania that will analyze water from private water supplies. For a listing of certified water testing laboratories go to <http://www.dep.state.pa.us/labs/>

It is very important that you have your water test conducted by a certified laboratory since these labs use standard testing methods.

Additional Resources

For further information and resources on drinking water quality:

* see fact sheet F101 *Drinking Water Publications from the Penn State College of Agricultural Sciences*

Please access:

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